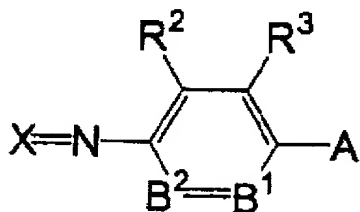


WHAT IS CLAIMED IS:

1. An ink-jet ink comprising a coloring composition containing a coloring particulate containing an ionic-group-containing polymer, an oil-soluble dye, and a hydrophobic high-boiling-point organic solvent having a boiling point of at least 150°C, the coloring particulate being dispersed in a water-based medium, wherein content of the hydrophobic high-boiling-point organic solvent in the coloring composition is at least 25% by mass and not more than 95% by mass with respect to a total amount of the ionic-group-containing polymer, the oil-soluble dye, and the hydrophobic high-boiling-point organic solvent.

2. An ink-jet ink according to claim 1 wherein the oil-soluble dye is represented by following general formula I:

general formula I



wherein X represents a residual group of a color coupler; A represents one of  $-NR^4R^5$  and a hydroxy group; R<sup>4</sup> and R<sup>5</sup> each independently represents one of a hydrogen atom, aliphatic group, aromatic group and heterocyclic group; B<sup>1</sup> represents one

group, aromatic group and heterocyclic group; B<sup>1</sup> represents one of =C(R<sup>6</sup>)- and =N-; B<sup>2</sup> represents one of -C(R<sup>7</sup>)= and -N=; R<sup>2</sup>, R<sup>3</sup>, R<sup>6</sup> and R<sup>7</sup> each independently represent one of a hydrogen atom, halogen atom, aliphatic group, aromatic group, heterocyclic group, cyano group, -OR<sup>51</sup>, -SR<sup>52</sup>, -CO<sub>2</sub>R<sup>53</sup>, -OCOR<sup>54</sup>, -NR<sup>55</sup>R<sup>56</sup>, -CONR<sup>57</sup>R<sup>58</sup>, -SO<sub>2</sub>R<sup>59</sup>, -SO<sub>2</sub>NR<sup>60</sup>R<sup>61</sup>, -NR<sup>62</sup>CONR<sup>63</sup>R<sup>64</sup>, -NR<sup>65</sup>CO<sub>2</sub>R<sup>66</sup>, -COR<sup>67</sup>, -NR<sup>68</sup>COR<sup>69</sup>, and -NR<sup>70</sup>SO<sub>2</sub>R<sup>71</sup>; R<sup>51</sup>, R<sup>52</sup>, R<sup>53</sup>, R<sup>54</sup>, R<sup>55</sup>, R<sup>56</sup>, R<sup>57</sup>, R<sup>58</sup>, R<sup>59</sup>, R<sup>60</sup>, R<sup>61</sup>, R<sup>62</sup>, R<sup>63</sup>, R<sup>64</sup>, R<sup>65</sup>, R<sup>66</sup>, R<sup>67</sup>, R<sup>68</sup>, R<sup>69</sup>, R<sup>70</sup> and R<sup>71</sup> each independently represents one of a hydrogen atom, aliphatic group and aromatic group; and any of pairs, R<sup>2</sup> and R<sup>3</sup>, R<sup>3</sup> and R<sup>4</sup>, R<sup>4</sup> and R<sup>5</sup>, R<sup>5</sup> and R<sup>6</sup>, and R<sup>6</sup> and R<sup>7</sup> may bond together to form a ring structure.

3. An ink-jet ink according to claim 1, wherein the ionic-group-containing polymer is a vinyl polymer.

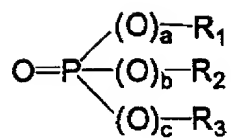
4. An ink-jet ink according to claim 1, wherein a relative dielectric constant at 25°C of the hydrophobic high-boiling-point organic solvent is from 3 to 12.

5. An ink-jet ink according to claim 1, wherein the vinyl polymer has at least one of carboxyl groups and sulfonic acid groups as ionic groups.

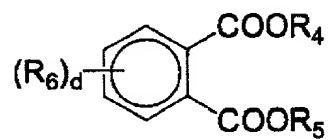
6. An ink-jet ink according to claim 1, wherein the

hydrophobic high-boiling-point organic solvent is at least one hydrophobic high-boiling-point organic solvent selected from hydrophobic high-boiling-point organic solvents represented by following formulae S-1 to S-9:

Formula [S-1]



Formula [S-2]



Formula [S-3]



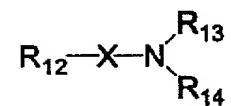
Formula [S-4]



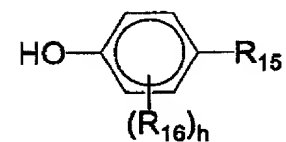
Formula [S-5]



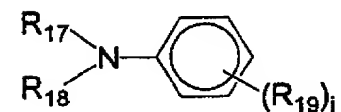
Formula [S-6]



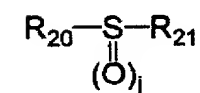
Formula [S-7]



Formula [S-8]



Formula [S-9]



wherein: in the formula S-1,  $\text{R}_1$ ,  $\text{R}_2$  and  $\text{R}_3$  each

independently represents one of an aliphatic group and an aryl group, and a, b and c each independently represents 0 or 1;

in the formula S-2,  $R_4$  and  $R_5$  each independently represents one of an aliphatic group and an aryl group,  $R_6$  represents one of a fluorine atom, chlorine atom, bromine atom, iodine atom, alkyl group, alkoxy group, aryloxy group, alkoxycarbonyl group and aryloxycarbonyl group, d represents an integer from 0 to 3, and, in a case where d is more than 1, one  $R_6$  may be different from another  $R_6$ ;

in the formula S-3, Ar represents an aryl group, e represents an integer from 1 to 6, and  $R_7$  represents one of an e-valent hydrocarbon group and a hydrocarbon group that is mutually bonded by an ether bond;

in the formula S-4,  $R_8$  represents an aliphatic group, f represents an integer from 1 to 6, and  $R_9$  represents one of an f-valent hydrocarbon group and a hydrocarbon group that is mutually bonded by an ether bond;

in the formula S-5, g represents an integer from 2 to 6,  $R_{10}$  represents a g-valent hydrocarbon group other than an aryl group, and  $R_{11}$  represents one of an aliphatic group and an aryl group;

in the formula S-6,  $R_{12}$ ,  $R_{13}$  and  $R_{14}$  each independently represents one of a hydrogen atom, aliphatic group and aryl group, X represents one of -CO- and -SO<sub>2</sub>-, and one of a pair  $R_{12}$  and  $R_{13}$  and a pair  $R_{13}$  and  $R_{14}$  may bond together mutually to

form a ring;

in the formula S-7,  $R_{15}$  represents one of an aliphatic group, alkoxycarbonyl group, aryloxycarbonyl group, alkylsulfonyl group, arylsulfonyl group, aryl group and cyano group,  $R_{16}$  represents one of a fluorine atom, chlorine atom, bromine atom, iodine atom, aliphatic group, aryl group, alkoxy group and aryloxy group,  $h$  represents an integer from 0 to 3, and in a case where  $h$  is more than 1, one  $R_{16}$  may be different from another  $R_{16}$ ;

in the formula S-8,  $R_{17}$  and  $R_{18}$  each independently represents one of an aliphatic group and an aryl group,  $R_{19}$  represents one of a fluorine atom, chlorine atom, bromine atom, iodine atom, aliphatic group, aryl group, alkoxy group and aryloxy group,  $i$  represents an integer from 0 to 4, and, in a case where  $i$  is more than 1, one  $R_{19}$  may be different from another  $R_{19}$ ;

in the formula S-9,  $R_{20}$  and  $R_{21}$  each independently represents an aliphatic group or aryl group, and  $j$  represents 1 or 2.

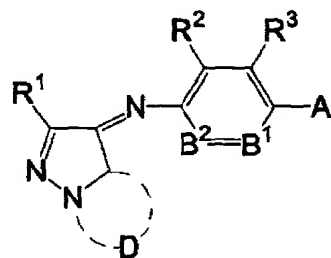
7. An ink-jet ink according to claim 1, wherein the content of the ionic-group-containing polymer is 1 to 70% by mass with respect to the total amount of the ionic-group-containing polymer, the oil-soluble dye, and the hydrophobic high-boiling-point organic solvent.

8. An ink-jet ink according to claim 1, wherein the content of the oil-soluble dye is 3 to 70% by mass with respect to the total amount of the ionic-group-containing polymer, the oil-soluble dye, and the hydrophobic high-boiling-point organic solvent.

9. An ink-jet ink according to claim 1, wherein average particle size of the coloring particulate is at most 100 nm.

10. An ink-jet ink according to claim 2, wherein the oil-soluble dye which is represented in said general formula I is a compound which is represented in the following general formula II:

General Formula II



wherein,  $R^2$ ,  $R^3$ , A,  $B^1$ , and  $B^2$  are synonymous with  $R^2$ ,  $R^3$ , A,  $B^1$ , and  $B^2$  in said general formula I;

$R^1$  represents one of a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, a cyano group,  $-OR^{11}$ ,  $-SR^{12}$ ,  $-CO_2R^{13}$ ,  $-OCOR^{14}$ ,  $-NR^{15}R^{16}$ ,  $-CONR^{17}R^{18}$ ,  $-SO_2R^{19}$ , -

$\text{SO}_2\text{NR}^{20}\text{R}^{21}$ ,  $-\text{NR}^{22}\text{CONR}^{23}\text{R}^{24}$ ,  $-\text{NR}^{25}\text{CO}_2\text{R}^{26}$ ,  $-\text{COR}^{27}$ ,  $-\text{NR}^{28}\text{COR}^{29}$ ,  
and  $-\text{NR}^{30}\text{SO}_2\text{R}^{31}$ ;

$\text{R}^{11}$ ,  $\text{R}^{12}$ ,  $\text{R}^{13}$ ,  $\text{R}^{14}$ ,  $\text{R}^{15}$ ,  $\text{R}^{16}$ ,  $\text{R}^{17}$ ,  $\text{R}^{18}$ ,  $\text{R}^{19}$ ,  $\text{R}^{20}$ ,  $\text{R}^{21}$ ,  $\text{R}^{22}$ ,  $\text{R}^{23}$ ,  $\text{R}^{24}$ ,  $\text{R}^{25}$ ,  
 $\text{R}^{26}$ ,  $\text{R}^{27}$ ,  $\text{R}^{28}$ ,  $\text{R}^{29}$ ,  $\text{R}^{30}$ , and  $\text{R}^{31}$  represent respectively  
independently one of a hydrogen atom, an aliphatic group, and  
an aromatic group;

D represents an atom group which forms one of a five-  
membered nitrogen-containing heterocyclic ring and a six-  
membered nitrogen-containing heterocyclic ring which may be  
substituted for at least one of an aliphatic group, an aromatic  
group, a heterocyclic group, a cyano group,  $-\text{OR}^{81}$ ,  $-\text{SR}^{82}$ ,  $-\text{CO}_2\text{R}^{83}$ ,  
 $-\text{OCOR}^{84}$ ,  $-\text{NR}^{85}\text{R}^{86}$ ,  $-\text{CONR}^{87}\text{R}^{88}$ ,  $-\text{SO}_2\text{R}^{89}$ ,  $-\text{SO}_2\text{NR}^{90}\text{R}^{91}$ , -  
 $\text{NR}^{92}\text{CONR}^{93}\text{R}^{94}$ ,  $-\text{NR}^{95}\text{CO}_2\text{R}^{96}$ ,  $-\text{COR}^{97}$ ,  $-\text{NR}^{98}\text{COR}^{99}$ , and -  
 $\text{NR}^{100}\text{SO}_2\text{R}^{101}$ ;

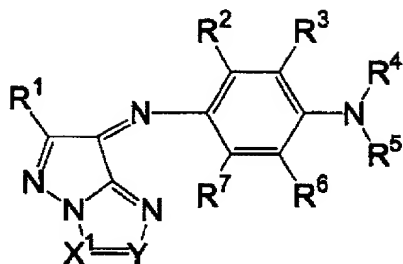
the heterocyclic ring may further form a condensed ring  
with another ring; and

$\text{R}^{81}$ ,  $\text{R}^{82}$ ,  $\text{R}^{83}$ ,  $\text{R}^{84}$ ,  $\text{R}^{85}$ ,  $\text{R}^{86}$ ,  $\text{R}^{87}$ ,  $\text{R}^{88}$ ,  $\text{R}^{89}$ ,  $\text{R}^{90}$ ,  $\text{R}^{91}$ ,  $\text{R}^{92}$ ,  $\text{R}^{93}$ ,  $\text{R}^{94}$ ,  $\text{R}^{95}$ ,  
 $\text{R}^{96}$ ,  $\text{R}^{97}$ ,  $\text{R}^{98}$ ,  $\text{R}^{99}$ ,  $\text{R}^{100}$ , and  $\text{R}^{101}$  represent respectively  
independently one of a hydrogen atom, an aliphatic group, and  
an aromatic group.

11. An ink-jet ink according to claim 10, wherein the  
compound which is represented in said general formula II is a  
compound which is represented in the following general  
formula III:



General formula III



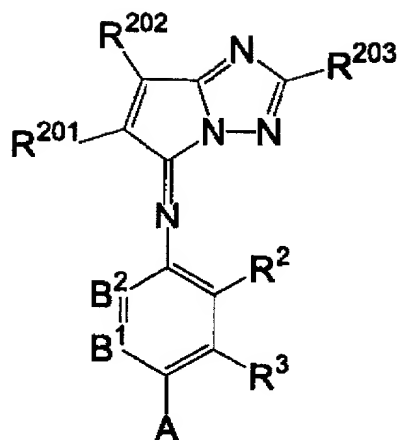
wherein,  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$ ,  $R^5$ ,  $R^6$ , and  $R^7$  are synonymous with  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$ ,  $R^5$ ,  $R^6$ , and  $R^7$  in said general formula II;

$X^1$  and  $Y$  represent respectively independently one of  $-C(R^8)=$  and  $-N=$ ;

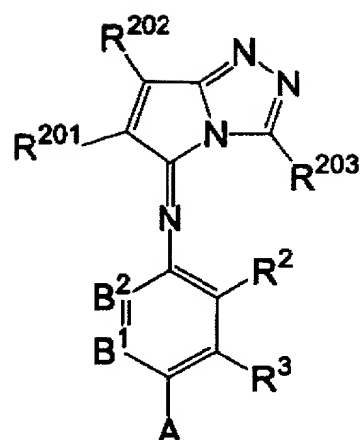
$R^8$  represents one of a hydrogen atom, an aliphatic group, and an aromatic group; and

one of  $X^1$  and  $Y$  is always  $-N=$ , and  $X^1$  and  $Y$  are  $-N=$  at different times.

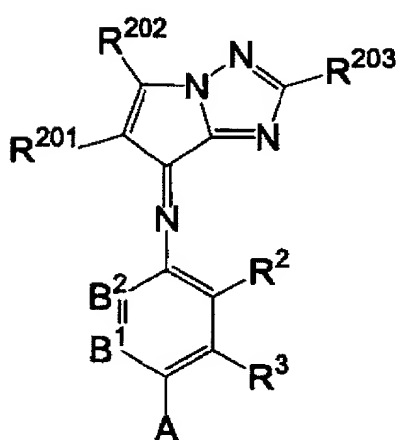
12. An ink-jet ink according to claim 2, wherein the oil-soluble dye which is represented in said general formula I is at least one of compounds which are represented in the following formulas IV-1 to IV-4:



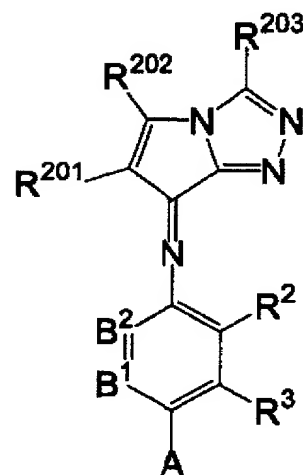
(IV-1)



(IV-2)



(IV-3)



(IV-4)

wherein, A, R<sup>2</sup>, R<sup>3</sup>, B<sup>1</sup>, and B<sup>2</sup> are synonymous with A, R<sup>2</sup>, R<sup>3</sup>, B<sup>1</sup>, and B<sup>2</sup> in said general formula I;

R<sup>201</sup>, R<sup>202</sup>, and R<sup>203</sup> represent respectively independently one of a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, a cyano group, -OR<sup>11</sup>, -SR<sup>12</sup>, -CO<sub>2</sub>R<sup>13</sup>, -OCOR<sup>14</sup>, -NR<sup>15</sup>R<sup>16</sup>, -CONR<sup>17</sup>R<sup>18</sup>, -SO<sub>2</sub>R<sup>19</sup>, -SO<sub>2</sub>NR<sup>20</sup>R<sup>21</sup>, -NR<sup>22</sup>CONR<sup>23</sup>R<sup>24</sup>, -NR<sup>25</sup>CO<sub>2</sub>R<sup>26</sup>, -COR<sup>27</sup>, -NR<sup>28</sup>COR<sup>29</sup>, and -

$\text{NR}^{30}\text{SO}_2\text{R}^{31}$ ;

$\text{R}^{11}, \text{R}^{12}, \text{R}^{13}, \text{R}^{14}, \text{R}^{15}, \text{R}^{16}, \text{R}^{17}, \text{R}^{18}, \text{R}^{19}, \text{R}^{20}, \text{R}^{21}, \text{R}^{22}, \text{R}^{23}, \text{R}^{24}, \text{R}^{25}, \text{R}^{26}, \text{R}^{27}, \text{R}^{28}, \text{R}^{29}, \text{R}^{30}$ , and  $\text{R}^{31}$  represent respectively independently one of a hydrogen atom, an aliphatic group, and an aromatic group; and

$\text{R}^{201}$  and  $\text{R}^{202}$  may be combined with each other and form a ring structure.

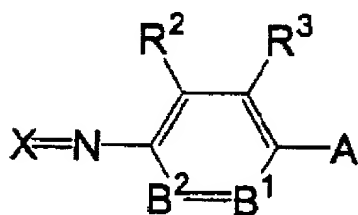
13. A coloring composition comprising a coloring particulate containing an ionic-group-containing polymer, an oil-soluble dye, and a hydrophobic high-boiling-point organic solvent having a boiling point of at least  $150^\circ\text{C}$ , the coloring particulate being dispersed in a water-based medium, wherein content of the hydrophobic high-boiling-point organic solvent in the coloring composition is at least 25% by mass and not more than 95% by mass with respect to a total amount of the ionic-group-containing polymer, the oil-soluble dye, and the hydrophobic high-boiling-point organic solvent.

14. An ink-jet recording method in which recording is conducted using an ink-jet ink on a recording material, the ink comprising a coloring composition containing a coloring particulate containing an ionic-group-containing polymer, an oil-soluble dye, and a hydrophobic high-boiling-point organic solvent having a boiling point of at least  $150^\circ\text{C}$ , the coloring

particulate being dispersed in a water-based medium, wherein content of the hydrophobic high-boiling-point organic solvent in the coloring composition is at least 25% by mass and not more than 95% by mass with respect to a total amount of the ionic-group-containing polymer, the oil-soluble dye, and the hydrophobic high-boiling-point organic solvent.

15. An ink-jet recording method according to claim 14 wherein the oil-soluble dye is represented by following general formula I:

general formula I



wherein X represents a residual group of a color coupler; A represents one of  $-NR^4R^5$  and a hydroxy group; R<sup>4</sup> and R<sup>5</sup> each independently represents one of a hydrogen atom, aliphatic group, aromatic group and heterocyclic group; B<sup>1</sup> represents one of  $=C(R^6)-$  and  $=N-$ ; B<sup>2</sup> represents one of  $-C(R^7)=$  and  $-N=$ ; R<sup>2</sup>, R<sup>3</sup>, R<sup>6</sup> and R<sup>7</sup> each independently represent one of a hydrogen atom, halogen atom, aliphatic group, aromatic group, heterocyclic group, cyano group,  $-OR^{51}$ ,  $-SR^{52}$ ,  $-CO_2R^{53}$ ,  $-OCOR^{54}$ ,  $-NR^{55}R^{56}$ ,

-CONR<sup>57</sup>R<sup>58</sup>, -SO<sub>2</sub>R<sup>59</sup>, -SO<sub>2</sub>NR<sup>60</sup>R<sup>61</sup>, -NR<sup>62</sup>CONR<sup>63</sup>R<sup>64</sup>, -NR<sup>65</sup>CO<sub>2</sub>R<sup>66</sup>, -COR<sup>67</sup>, -NR<sup>68</sup>COR<sup>69</sup>, and -NR<sup>70</sup>SO<sub>2</sub>R<sup>71</sup>; R<sup>51</sup>, R<sup>52</sup>, R<sup>53</sup>, R<sup>54</sup>, R<sup>55</sup>, R<sup>56</sup>, R<sup>57</sup>, R<sup>58</sup>, R<sup>59</sup>, R<sup>60</sup>, R<sup>61</sup>, R<sup>62</sup>, R<sup>63</sup>, R<sup>64</sup>, R<sup>65</sup>, R<sup>66</sup>, R<sup>67</sup>, R<sup>68</sup>, R<sup>69</sup>, R<sup>70</sup> and R<sup>71</sup> each independently represents one of a hydrogen atom, aliphatic group and aromatic group; and any of pairs, R<sup>2</sup> and R<sup>3</sup>, R<sup>3</sup> and R<sup>4</sup>, R<sup>4</sup> and R<sup>5</sup>, R<sup>5</sup> and R<sup>6</sup>, and R<sup>6</sup> and R<sup>7</sup> may bond together to form a ring structure.

16. An ink-jet recording method according to claim 14 wherein the recording material includes a substrate on which is provided an ink receiving layer containing a porous inorganic pigment.

17. An ink-jet recording method comprising the step of:  
 (a) preparing an ink-jet ink, containing coloring composition in which coloring particulate containing an ionic-group-containing polymer, an oil-soluble dye, and a hydrophobic high-boiling-point organic solvent having a boiling point of at least 150°C are dispersed in an aqueous medium, with the content of the hydrophobic high-boiling-point organic solvent in the coloring composition being at least 25% by mass and not more than 95% by mass with respect to total amount of the ionic-group-containing polymer, the oil-soluble dye, and the hydrophobic high-boiling-point organic solvent,

(b) disposing the ink-jet ink in a cartridge adapted for use

in an ink-jet printer, and

(c) using the cartridge in an ink jet printer for recording images.

18. An ink-jet recording method according to claim 17, wherein the step of preparing an ink-jet ink includes the sub-step of dispersing the ionic-group-containing polymer, the oil-soluble dye, and the hydrophobic high-boiling-point organic solvent by a co-emulsifying dispersion technique.